

**NATIONAL UNIVERSITY OF LIFE
AND ENVIRONMENTAL SCIENCES OF UKRAINE**

Department Forest Restoration and Meliorations

“ APPROVED ”
by Education and Research
Institute of Forestry
and Landscape-Park Management
“11” June 2026

CURRICULUM OF ACADEMIC DISCIPLINE
Agroforestry systems, practices and technologies

Area of knowledge H Agriculture, forestry, fisheries and veterinary medicine

Specialty H4 “Forestry”

Academic program “Forestry”

Institute Education and Research Institute of Forestry
and Landscape-Park Management

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Kyiv – 2026

Description of the discipline Agroforestry systems, practices and technologies

The course covers the peculiarities of agroforestry approaches, the impact of protective plantings of various structural features on reducing wind speed, distributing the canopy cover, and improving soil condition and microclimate. The directions of spatial distribution, management, and impact of agroforestry approaches are analyzed.

Area of knowledge, specialty, academic programme, academic degree		
Academic degree	Master	
Specialty	H4 "Forestry"	
Academic programme	Forestry	
Characteristics of the discipline		
Type	Selective	
Total number of hours	180	
Number of ECTS credits	6	
Number of modules	3	
Course project (work) (if any)	-	
Form of assessment	Exam	
Indicators of the discipline for full-time and part-time forms of university study		
	University study	
	Full-time	Part-time
Year of study	2	
Term	3	
Lectures	20 hr.	
Practical classes and seminar	20 hr.	
Laboratory classes		
Self-study	140 hr.	
Individual assignments		
Number of hours per week for full-time students	4 hr.	

1. Aim, competences and expected learning outcomes of the discipline

The aim of the discipline is to study the impact of woody plant species on improving soil conditions and environment, agro-landscapes by creating different types of agroforestry plantations, their spatial location and management of agroforestry plantations.

The subject of the discipline "Agroforestry systems, practices, technologies" is a system of general principles and approaches related to scientific and practical activities in the field of agroforestry, forestry and urban ecology, and landscape science.

List of educational components that precede the study of the academic discipline: Methodology and Organization of Research of Forest Ecosystems.

The objectives of the discipline are:

- acquisition of skills to apply the theoretical knowledge obtaining in the learning process on agroforestry, phytomelioration, urban ecology.

- gaining experience in the ability to substantiate agroforestry approaches to the design and creation of agroforestry plantations, optimization of the ecological component.

Competences acquired:

Integral competence (IC):

Ability to solve complex tasks and problems in the field of agroforestry in the process of learning, which involves conducting research or implementing innovations and is characterized by uncertainty of conditions and requirements.

General competence (GC)

GC 7. Ability to work in an international context.

Special (professional) competences (SC)

SC 3. The ability to evaluate regional peculiarities of natural and climatic conditions for the organization of effective agroforestry, the performance of various functions by forests and the increase of forest areas.

SC 5. Ability to integrate knowledge and solve complex forestry problems in broad or multidisciplinary contexts

Expected learning outcomes (ELO):

ELO 1. Specialized conceptual knowledge, which includes modern scientific achievements in the field of agroforestry and is the basis for original thinking, ensuring sustainable development and conducting research.

ELO 2. Communicate freely orally and in writing in Ukrainian and foreign languages when discussing professional issues, research and innovations in the field of forestry.

ELO 4. Search for necessary data in scientific literature, databases and other sources, analyze and evaluate these data;

ELO 7. Develop and implement scientific and applied projects in the field of forestry, taking into account available resources and risks, as well as economic, legal and environmental aspects.

ELO 11. Apply modern experimental and mathematical methods, digital technologies and specialized software to solve complex problems of forestry and hunting.

ELO 12. Conduct research and/or conduct innovative activities in order to obtain new knowledge and create new technologies and products in forestry and hunting and in wider multidisciplinary contexts.

2. Program and structure of the discipline

Modules and topics	Number of hours													
	Full-time							Part-time						
	weeks	total	including					total	including					
			<i>l</i>	<i>p</i>	<i>lab</i>	<i>ind</i>	<i>s.st</i>		<i>l</i>	<i>p</i>	<i>lab</i>	<i>ind</i>	<i>s.st.</i>	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Module 1. Structure, anthropogenic impacts and monitoring of agroforestry landscape														
Topic 1. Agroforestry is a key element of land use	1	16	2	2				46						
Topic 2. Structure of agroforestry landscape and anthropogenic impacts	2-3	28	4	4										
Topic 3. Agroforestry monitoring	4-5	16	2	-										
Total for module 1		60	8	6				46						
Module 2. Aboveground and Belowground Interactions in Tree-Crop Agroforestry														
Topic 4. Differentiation of the territory according to erosion processes	6	20	2	4				47						
Topic 5.	7-8	20	2	2										

Methods of conducting research on wind speed and snow accumulation in field protective forest plantations													
Topic 6. Methods of planning and analyzing soil research in field protective forest plantations	9-10	20	2	2									
Total for module 2		60	6	8			47						
Module 3. Agroforestry and the Global Goals													
Topic 7. Agroforestry for ecosystem services and environmental benefits	11	26	2	4									
Topic 8. Social and economic implications of agroforestry for rural economic development	12-13	20	2	2			48						
Topic 9. Agroforestry practices implementation in Ukraine: current state, policy, challenges and prospective	14-15	14	2	-									
Total for module 2		60	6	6			48						
Total hours		180	20	20			140						

3. Topics of lectures

No.	Topic	Hours
1	Agroforestry is a key element of land use	2
2	Structure of agroforestry landscape and anthropogenic impacts	4
3	Agroforestry monitoring	2
4	Differentiation of the territory according to erosion processes	2
5	Methods of conducting research on wind speed and snow accumulation in field protective forest plantations	2
6	Methods of planning and analyzing soil research in field protective forest plantations	2
7	Agroforestry for ecosystem services and environmental benefits	2
8	Social and economic implications of agroforestry for rural economic development	2
9	Agroforestry practices implementation in Ukraine: current state, policy, challenges and prospective	2

4. Topics of practical classes

No.	Topic	Hours
1	Analysis of the structural components of the landscape.	2
2	Determination of anthropogenic loads on landscapes	4
3	Landscape modeling in Archicad	4
4	Simulation of wind speed reduction in fields under protection of windbreaks.	2

	Determination of total wind protection and uniformity coefficient	
5	Simulation of analysis of soil properties in fields under protection of windbreaks.	2
6	Restoration Opportunities Assessment Methodology (ROAM) as a tool of involving agroforestry practices in forest landscape restoration and Individual Act	4
7	PESTE analysis of Agroforestry practices implementation	2

5. Topics of self-study

No.	Topic	Hours
1	Structure of agroforestry landscape and anthropogenic impacts	46
2	Aboveground and Belowground Interactions in Tree-Crop Agroforestry	47
3	SWOT-analysis of different agroforestry practice types	48

6. Methods of assessing expected learning outcomes:

In the process of studying the discipline, an explanatory and illustrative teaching method is used, with the help of which students gain knowledge in lectures and practical classes, from educational and teaching-methodical literature. This method is widely used when submitting a large array of information.

The method of problem presentation is used in the process of practical classes, when the teacher poses a problem to the presentation of the material, formulates a cognitive task based on various sources and means, and shows the method of solving the task.

7. Teaching methods:

- verbal method (lecture, discussion, interview, etc.);
- video method (remote, multimedia, web-based, etc.);
- independent work (task completion);
- problem-based learning method;
- practice-oriented learning method;
- case method;
- project-based learning method;
- research-based learning method;
- educational discussions and debates;
- teamwork, brainstorming
- gamified learning method.

8. Results assessment

The student's knowledge is assessed by means of a 100-point scale converted into the national grades according to the "Exam and Credit Regulations at NULES of Ukraine" in force

8.1. Distribution of points by types of educational activities

Educational activity	Results	Assessment
Module 1. Structure, anthropogenic impacts and monitoring of agroforestry landscape		
Practical work 1. Analysis of the structural components of the landscape.	ELO. 1, 2, 4, 7, 11, 12. As well as analyze structural components of the landscape and determine anthropogenic pressures on landscapes. Formulate the structure of agroforestry landscapes and anthropogenic influences on them.	20
Practical work 2. Determination of anthropogenic loads on landscapes		40
Self-study 1. Structure of agroforestry landscape and anthropogenic impacts		10
Module control work 1. Module test		30
Total for module 1		100
Module 2. Aboveground and Belowground Interactions in Tree-Crop Agroforestry		
Practical work 3. Landscape modeling in ArchiCAD	ELO. 1, 2, 4, 7, 11, 12. Perform landscape modeling in ArchiCAD, model wind speed reduction and snow	20
Practical work 4. Simulation of wind		20

velocity reduction under protection of windbreaks. Determination of total wind protection and uniformity coefficient	distribution depending on the influence of shelterbelts of various designs. Determine the overall wind protection coefficient and uniformity coefficient. Perform modeling of soil properties in fields and determine the soil improvement coefficient.	
Practical work 5. Simulation of analysis of soil properties in fields under windbreaks protection.		20
Self-study 2. Aboveground and Belowground Interactions in Tree-Crop Agroforestry		10
Module control work 2. Module test		30
Total for module 2		100
Module 3. Agroforestry and the Global Goals		
Practical work 6. Restoration Opportunities Assessment Methodology (ROAM) as a tool of involving agroforestry practices in forest landscape restoration and Individual Act	ELO. 1, 2, 4, 7, 11, 12. Use the restoration potential assessment methodology as a tool for involving agroforestry in forest landscape restoration and individual actions. Conduct a PESTE analysis of agroforestry implementation and a SWOT analysis of its various types.	30
Practical work 7. PESTE analysis of Agroforestry practices implementation		20
Self-study 3. SWOT-analysis of different agroforestry practice types		20
Module control work 3. Module test		30
Total for module 3		100
Class work		70
Exam/credit		30
Total for year		100

8.2. Scale for assessing student's knowledge

Student's rating, points	National grading (exam/credits)
90-100	excellent
74-89	good
60-73	satisfactory
0-59	unsatisfactory

8.3. Assessment policy

Deadlines and exam retaking rules	<i>EXAMPLE:</i> works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer if there are valid reasons (e.g. a sick leave).
Academic integrity rules	<i>EXAMPLE:</i> cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used
Attendance rules	<i>EXAMPLE:</i> Attendance is compulsory. For good reasons (e.g. illness, international internship), training can take place individually (online by the faculty dean's consent)

9. Educational and methodological support

1. E-learning course of the discipline <https://elearn.nubip.edu.ua/course/view.php?id=4321>

2. Agroforestry. Working program, methodic advices to the practical classes and self-works for students of Education level «Bachelor» Specialty: 193 - Geodesy and land inventory / V. Yukhnovskyi, O. Sovakov, G. Lobchenko. K.: Comprint, 2024. 36 p.

10. Recommended sources of information

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3. Douglas G., Walcroft A., Hurst S. et al. Interactions between widely spaced young poplars (*Populus* spp.) and introduced pasture mixtures. *Agroforestry Systems*. 66(2). 2006. 165-178.
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5. Garrett H., Buck L., Gold M. et al. *Agroforestry: An Integrated Land-Use Management System for Production and Farmland Conservation*. Resource Conservation Act (RCA) Appraisal of U.S. Agroforestry USDA Natural Resources Conservation Service, 1994. 58 p.
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9. Kuemmel B (2003) Theoretical investigation of the effects of field margin and hedges on crop yields. *Agr Ecosyst Environ* 95:387–392. [https://doi.org/10.1016/S0167-8809\(02\)00086-5](https://doi.org/10.1016/S0167-8809(02)00086-5)
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12. Mosquera –Losada M., Moreno G., Pardini L. et al. Past, Present and Future of Agroforestry Systems in Europe. [Электронний ресурс]. Реж.дост.: http://www.agrooof.net/agrooof_ressources/documents/201210_eu_agroforesterie.pdf.
13. Mosquera-Losada M-R., Pantera A., Rosati A., Amaral J., Smith J., Rigueiro-Rodn'guez A., Watte J., Dupraz C. What priorities for European Agroforestry? The First European agroforestry conference (Brussel, 9-10 October, 2012). 73.
14. Nuberg IK (1998) Effect of shelter on temperate crops: a review to define research for Australian conditions. *Agrofor Syst Int J* 41(1998):3–34.
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20. Smith J, Pearce BD, Wolfe MS (2013) Reconciling productivity with protection of the environment: is temperate agroforestry the answer? *Renew Agric Food Syst* 28:1–13. <https://doi.org/10.1017/S1742170511000585>
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